

Designing, Developing, and Deploying Information Appliances

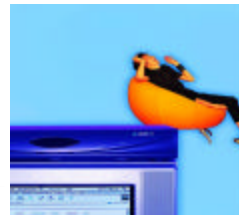
Home Clients Go to Market

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What is an Information Appliance?

- **Consumer**
 - Any non-PC device that delivers all or some portion of its benefits via a connection to the Internet
- **Commercial**
 - Thin clients, Windows-based terminals
 - POS
 - Appliance servers
- **Form-factor**
 - Wired or wireless
 - CRT, LCD, or TV display

Information Appliance vs. the PC

- **PC Selection criteria**
 - MHz
 - Price
 - What's "Inside"
- **IA Selection criteria**
 - What does it do? Does it do it well?
 - Is it "compatible" with the web?
Can it run web-based applications?
 - Communications and Display
 - Size and power - Where will I put it?
 - Price

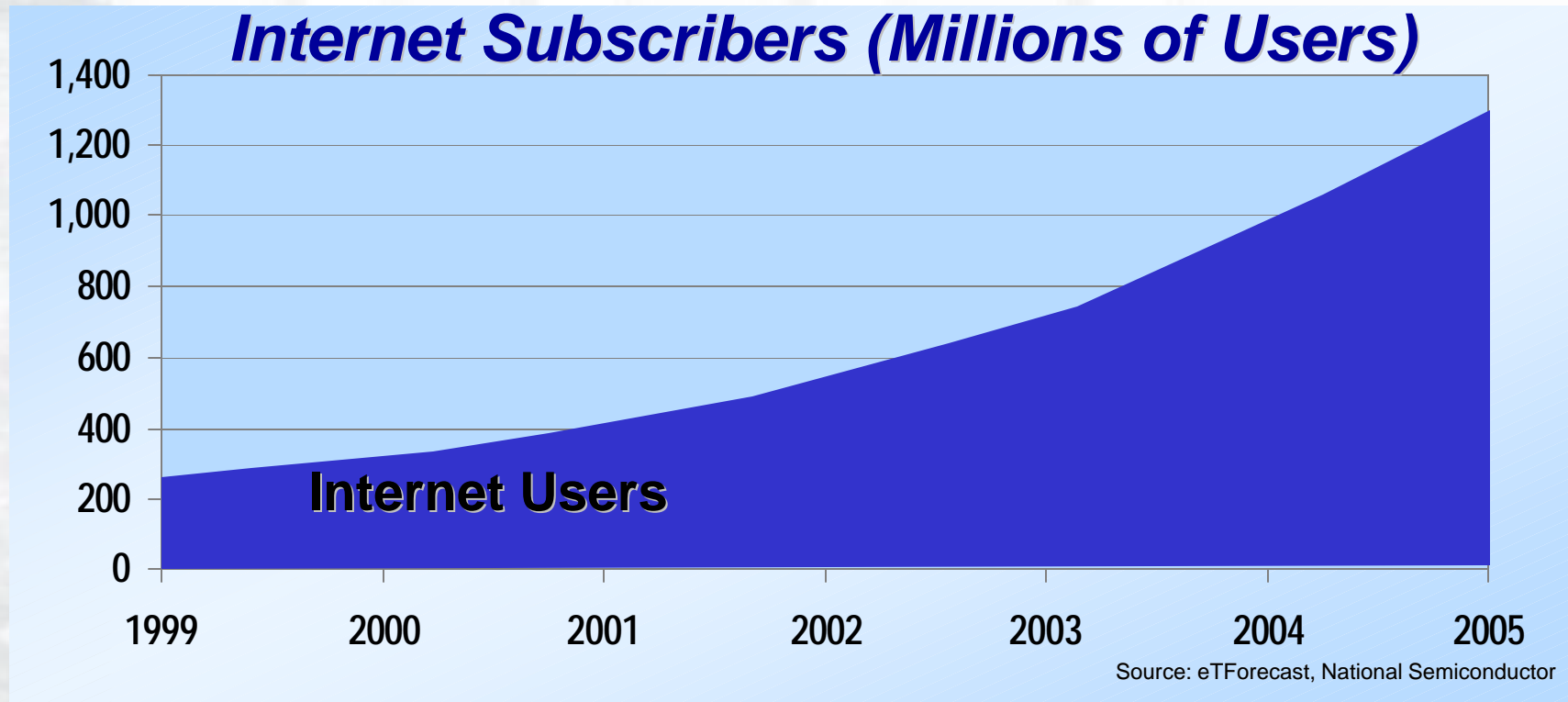
Consumers Want Products That Are:

- Simple, easy to use
- Connected to the information THEY WANT
- No boot up...always on 24/7
- Portable, small, low power
- Simplify their lives not complicate it

The Product Isn't Just The Box

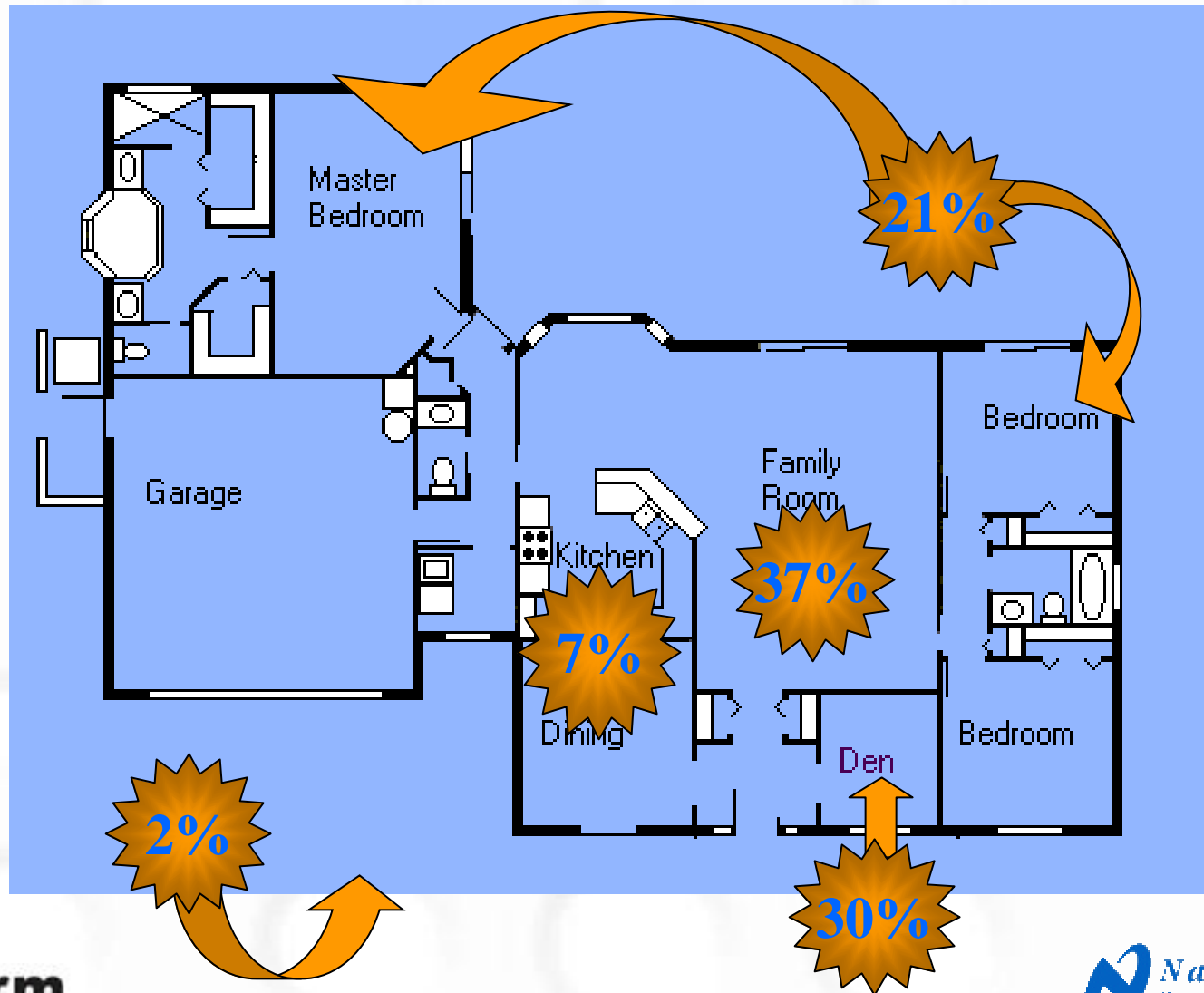
- The display is the product
- Connectivity is the product
- Content is the product
- Services are the product
- Productivity is the product
- The *user-experience* is the product

Internet Subscribers Soaring at 118% Per Year!



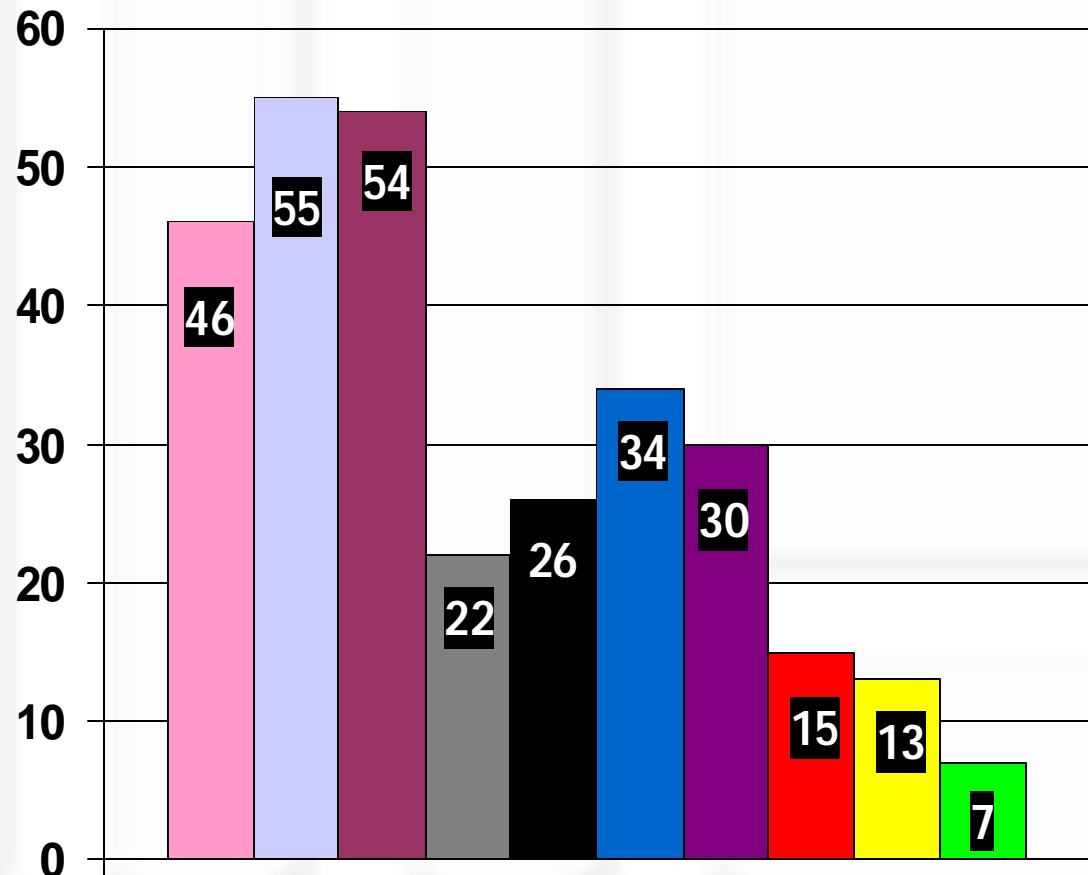
The credit to date goes to ...the PC!

Internet Access Points: The PC Era



Other Technologies: How many years it took to spread to 25% of USA population

- Household electricity (invented 1873)
- Automobile (1885)
- Airplane (1903)
- Radio (1906)
- Television (1925)
- VCR (1952)
- Microwave oven (1953)
- PC (1975)
- Cellular phone (1983)
- Internet (1991)



Source: Consumer Electronics Manufacturers Assn

Technology Adoption Lessons

- The rate of adoption of new technologies is accelerating
- The Internet is truly a compelling technology
- It took only seven years...

*even with a complex access device
hidden in out-of-the-way locations!*

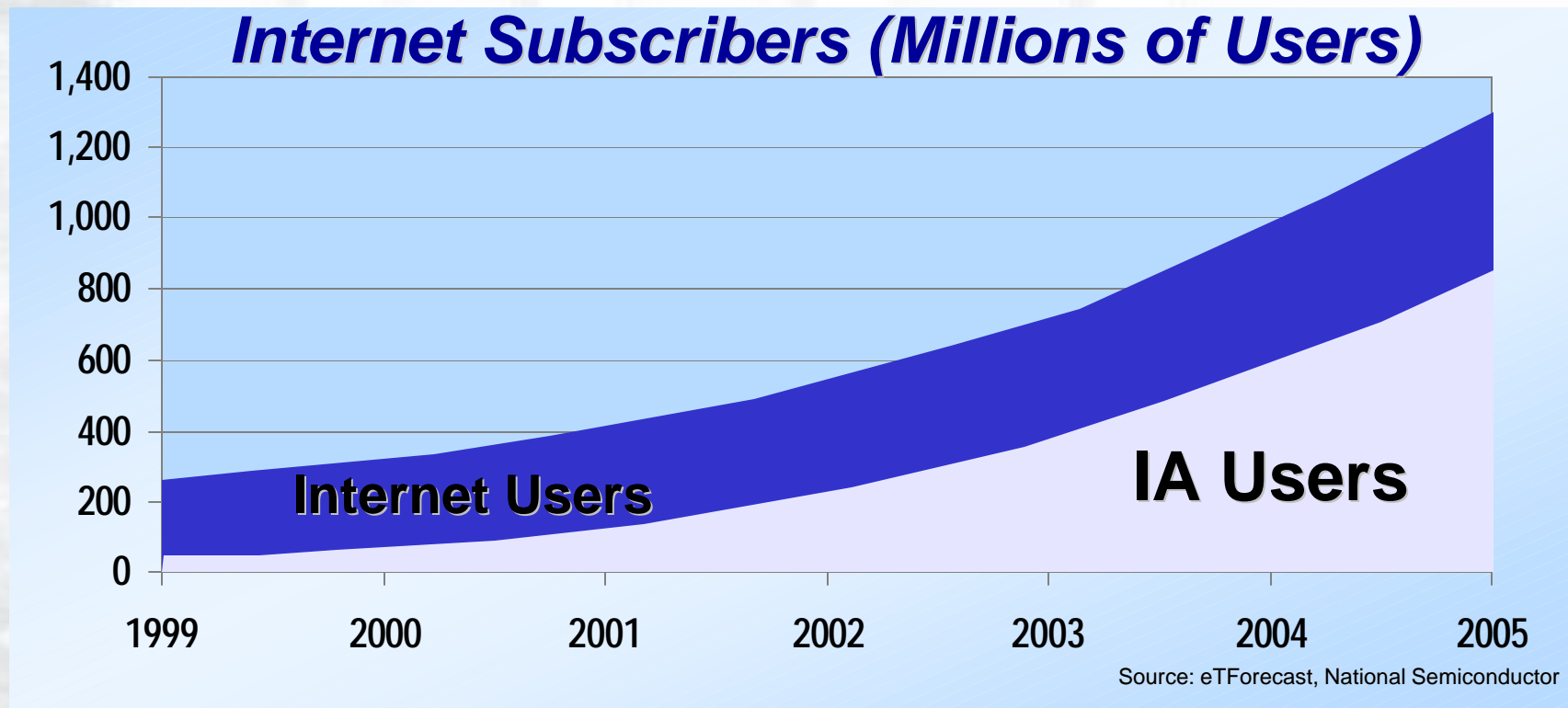
Early Days of the Internet: the personal computer

- The time: now
- The new technology:
the Internet
- The “home motor”: the PC
 - The vast majority of internet access today is from a PC
 - This will change

The early days are almost over



Internet Subscribers Soaring at 118% Per Year!



The Internet tomorrow

- By 2003 almost half of all Internet users will access the internet from something other than a PC!
- What form factors will these devices be?

The answer's already partly visible...today!

Today's IA Segmentation: *A Tale of Two Markets*

- IA Target Customer #1:
The non-PC household
 - For these consumers...
 - The PC is intimidating
 - They feel like they are being left out of the internet revolution
 - Email & browsing are the focus apps
 - The IA value advantage:
 - Ease of use
 - Guided content, integrated experience
 - price
- IA Target Customer #2:
The PC-savvy family
 - For these consumers...
 - The PC is not convenient
 - The location is not convenient
 - Email and browsing are means to an end
 - The IA value advantage:
 - Instant-on
 - Form factor & user model is context-relevant
 - Interoperability with existing devices

Today's Form Factors

Consumer Access Devices



Displayless



Tethered CRT



Set-Top Box



Tethered



Tablet

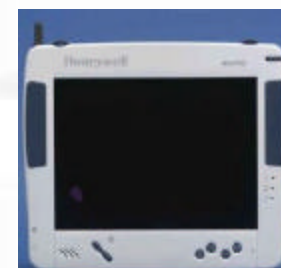
Enterprise Thin Clients



Displayless



Integrated



Mobile Thin Client

Compaq's iPAQ MSN Companion

- Compaq IA-2
 - “simple setup”
 - “no computer experience necessary”
 - “personalized content from MSN”

Source: Compaq

- ISP subsidy model



eMachine's MSN Companion

- “...the Internet to consumers in a simple and affordable way”
- For use with external monitor
- Small form factor
- ISP subsidy model



3Com's Ergo™ Audrey™ device

- “Radical simplicity”
- Family “nerve center” user model
 - Internet “channel selector”
 - 3 ways to email
 - appointments and contact management
- Get-on, get-off user model
- No subsidy model

Source: 3Com Oct 2000



Honeywell's WebPAD™ appliance

First of many web-enabled solutions from Honeywell. They found:

- 81% of their customers want access to Internet at home
 - 61% found it “hard to imagine doing without” Internet access
- Most would find it more useful if they could log on wherever they wanted
 - >50% wanted access in the kitchen
 - >50% wanted access in the garage
- “Technologies in the home continue to converge, allowing the integration, monitoring and controlling of key home functions via the Internet”



Honeywell WebPAD™ Device

Part of Home Control strategy

Source: Honeywell Oct 2000

Sony's eVilla

- Easy-to-use yet powerful
- “Network Entertainment Center”
- Simplicity
 - “Using the Internet through a PC can be a slow and frustrating process even for the most computer-literate consumer”
 - No long boot-up
 - No hassles managing plug-ins
- “We haven’t just made it easier, but we’ve also made it more fun”
- Ultra high-resolution display
- Integrated ISP package

Source: Sony Jan 2001



Enabling Requirements



Set-Top Box



Personal Access Devices



Commercial Thin Client

1. Optimum “technology solution”

- Balance of 3 “P”s
 - Performance, power and price
- Smart integration
 - Analog, connectivity and IA technology

2. Great “reference designs”

- Fast time to market

3. Partner infrastructure support

- Manufacturing
- Software & hardware development
- Channel development

The Right Performance

- “Basic” Internet functions
 - HTML
 - Some XML
 - Popular plug ins
 - JAVA
 - Optimize for the pipe!
- Scale for specific performance demands with optimized HW accelerators
- Compatibility to the Internet
 - x86 is critical

Extending Performance

- Core processing on the x86 is NOT the most efficient way to run all applications
- High-end decoding and encoding will ALWAYS be better with “external” on board or on-chip accelerators
- Which do you think is cheaper, lower power, and better performance?
 - PIII600 solution plus HW decode software or
 - Geode™ GX1 solution plus HW decoder

Low Power

- Small native x86 instruction set core
- Small memory footprint
- High integration of peripherals
- Block, frequency, voltage regulation
- Latest process technology

Low Price

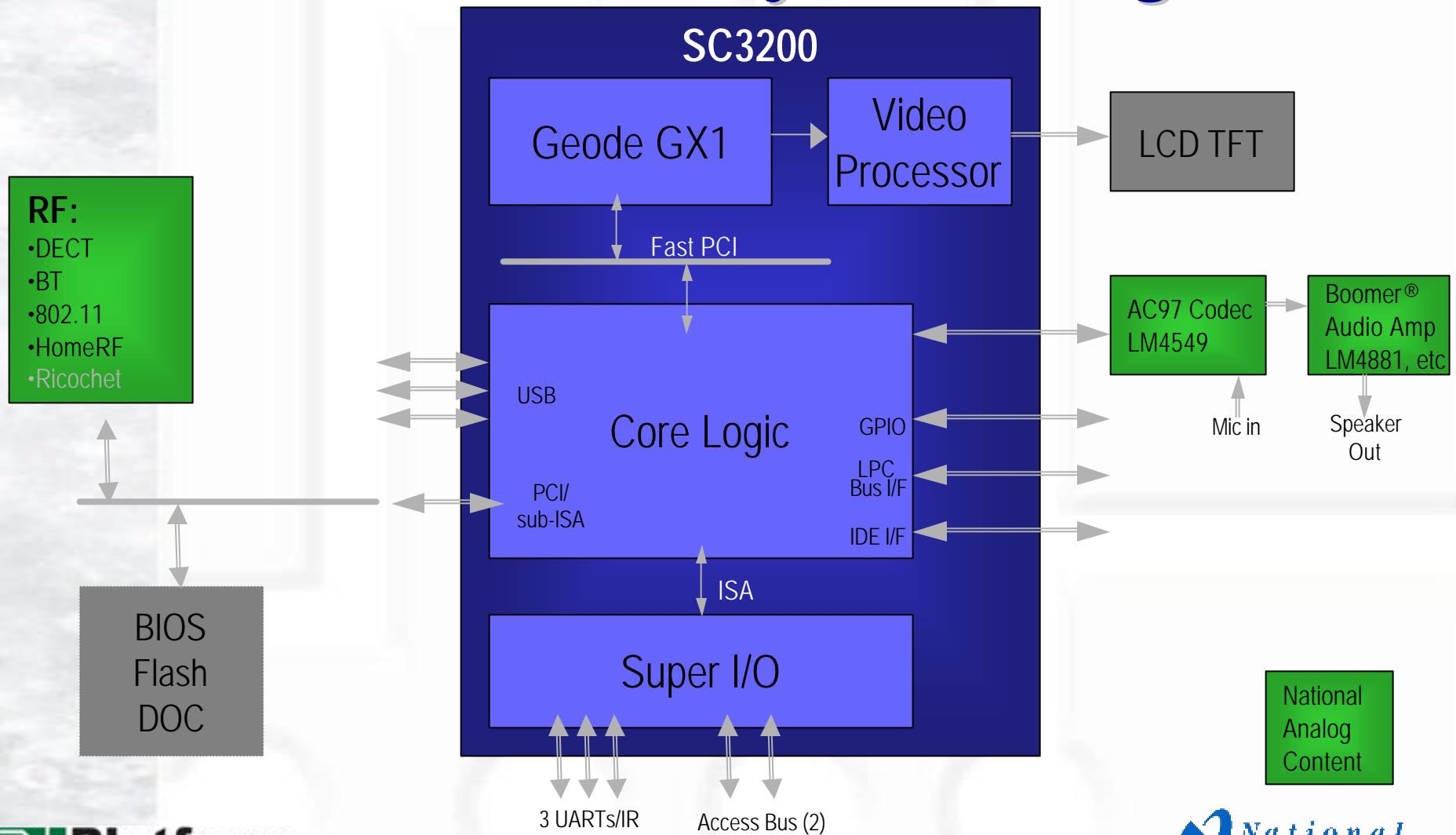
- System level
 - Must minimize Flash/SDRAM memory
- Integration
 - Single-Chip solutions now available
- Manufacturing
 - Latest process technology
 - High yield, high volumes, low package cost, low wafer cost

Processor Summary

- The right performance
 - Keep up with Internet applications and the pipe
 - Add on-board or on-chip HW accelerators for spike requirements
- Integration
 - Great advantages for cost and power
 - Don't exceed optimum die size or package ball counts
- Reusable blocks
 - Don't change everything every time
 - Be ready to customize

System-level Silicon Integration

Geode™ SC3200 System Diagram

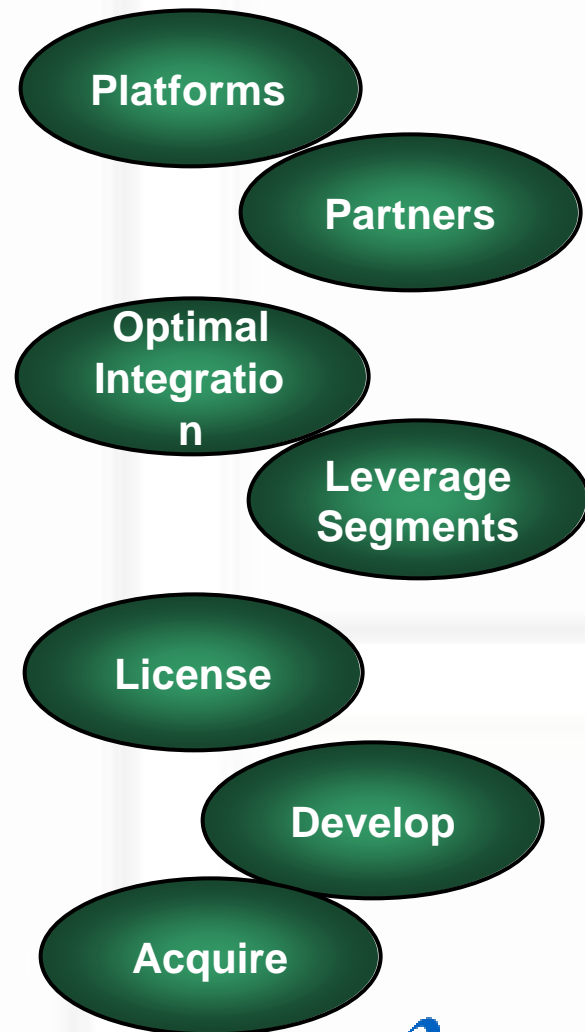


What's Next: New Technologies

- Further integration
 - 3P - price, performance and power
 - Reusable IP - broad customization
 - PIA - Personal Information Agent
- Wireless everything

Technology Provider's Value Proposition

- Time to Market
 - Total System Solution
 - Best Target System Expertise & Service
 - Key Strategic Partnerships
- Optimized System Cost
 - Integration Roadmap
 - Cross Platform Portability/Leverage
- Right Technology @ Right Time
 - Security
 - Biometrics
 - End User Experience
 - Audio, Video & Graphics
 - Hand Writing Recognition, Security, Voice
 - Communications
 - Wireless & Wire-Line



Building an Information Appliance Infrastructure

- Geode™ Customers
 - 3Com
 - Boundless
 - Compaq
 - Dell
 - Ericsson
 - GE
 - Honeywell
 - IBM
 - Legend
 - Philips
 - Sony
 - Vestel
 - Wyse
- Channel Partners:
 - AOL
 - Microsoft (MSN)
 - Cable Cos
 - Education Ind.
 - Grocery Ind.
 - Financial Ind.
 - Satellite Service Cos
 - Telephone Cos
- ODM Customers:
 - Acer
 - Allwell
 - Arima
 - Celestica
 - Delta
 - DT Research
 - Proview
 - FIC
 - Informtech
 - Quanta
 - RSC
 - Samsung
 - Takaoka
 - Tatung
- Technology Partners:
 - BeIA
 - bSquare
 - Citrix
 - CIC
 - Inprimis
 - **Insyde**
 - Liberate Technologies
 - Lineo
 - Merinta
 - Metricom
 - **Microsoft**
 - QNX
 - **Tuxia**
 - Wind River
 - Xirlink

and many more...

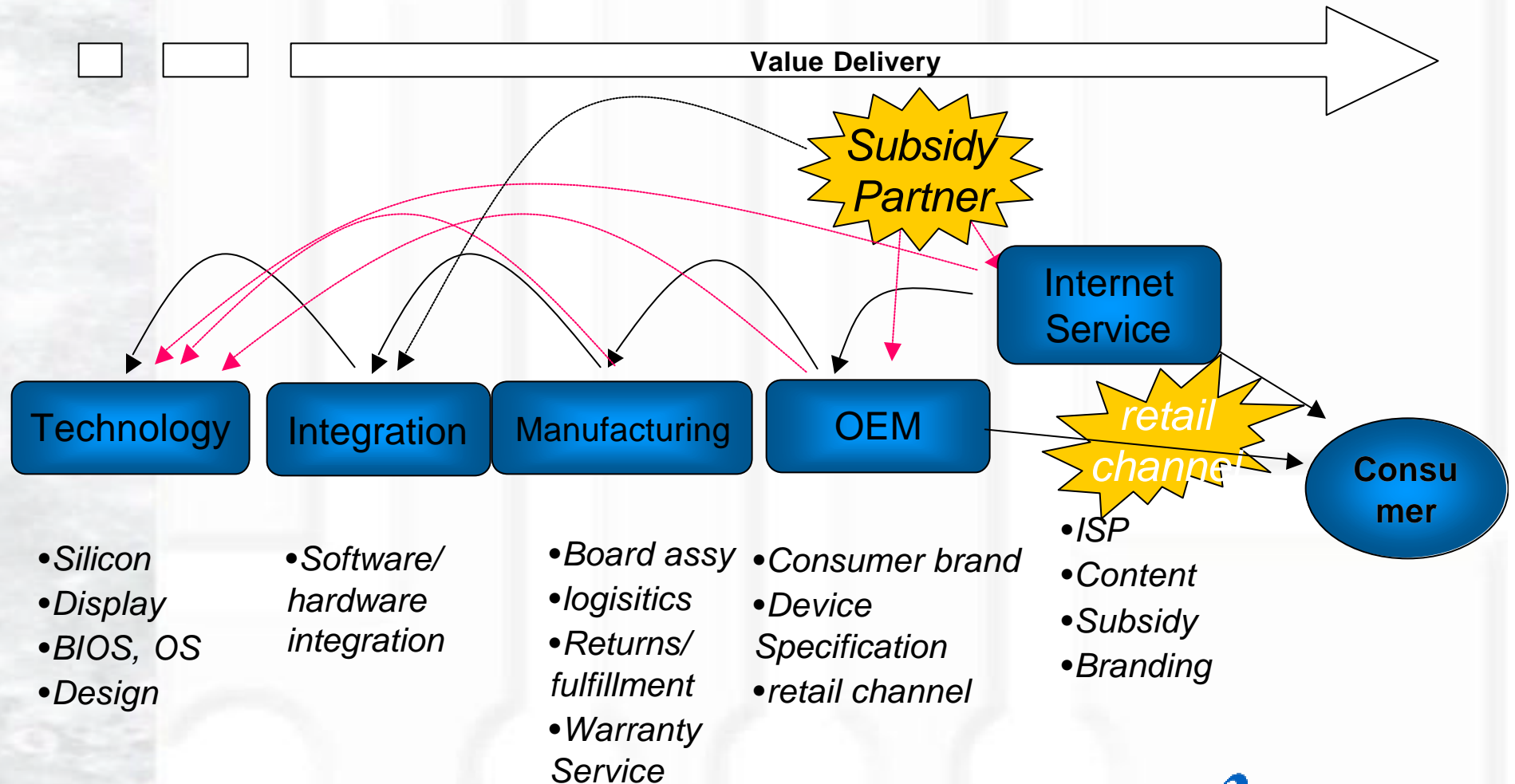
The Market is Here!

- The Internet market is waiting for no one
- Great products are now beginning to enter the market
 - Sony eVilla, 3COM Audrey, Compaq iPAQ, Philips AOLTV, Honeywell WebPAD™ device, and many more in the works
- Information appliances will connect hundreds of millions to the Internet
- Devices, services and content will cause the market to accelerate

Just one more thing...

- The most highly integrated, optimized, high performance, low cost hardware solution will fail miserably if the software is weak
 - Time to market
 - Cross-platform leverage
 - Developers environment
 - Compatibility
 - OEM brain-suck
 - Infrastructure partners

Simplified IA market chain



Market Chain Learnings

- Business models are formative
- Business models are complex
- Uncertainty in market chain breeds opportunity for new players
- Window is finite

Thanks !